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EXAMINER

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/506,744  
Filing Date: March 08, 2005  
Appellant(s): DIAMANTOPOULOS, LEONIDAS

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Jay Sandvos  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed November 7, 2008 appealing from the Office action mailed July 25, 2008.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

No amendment after final has been filed.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

5,833,608	ACKER	11-1998
WO 01/74263 A1	DIAMANTOPOULOS et al	10-2001

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 15-17, 19, 20 and 24-29 are rejected under 35 U.S.C. 102(a) as being anticipated by Diamantopoulos et al (WO 01/74263 A1).

With respect to **Claim 15**: Diamantopoulos teaches a catheter comprising at least one resiliently biased projection 11 and at least one detector in the form of thermal sensors 10 that generate a signal that creates temperature data and varies as a function of radial displacement (e.g. due to the presence of a plaque on the vessel wall) relative to the longitudinal axis of said catheter of the at least one projection 11 upon which the detectors are disposed. (Abstract, Page 2, lines 28-33, Page 5, lines 3-8, 30-33)

With respect to **Claim 16**: Detectors 10 are variable capacitor sensors. (Page 13, lines 1-3)

With respect to **Claim 17**: Variable capacitor detectors 10 are permanently attached to the end of each projection 11, i.e. they are mounted on the at least one resiliently biased projection 11.  
(Page 5, lines 19, 20)

With respect to **Claim 19**: A detector 10 is capable of being formed integrally with its respective projection. (Page 5, lines 19-22)

With respect to **Claim 24**: Diamantopoulos teaches that the projections may not lie in the same plane and are resilient, therefore they are independently biased.

With respect to **Claim 25**: The at least one detector 11 is mounted on a separate projection 10.

With respect to **Claims 26,27**: The projections 11 are comprised of superelastic material. Diamantopoulos teaches Ni-Ti ternary alloys (i.e. nitinol) as the material for the projections.  
(Page 4, lines 26-33)

With respect to **Claim 28**: The at least one resiliently biased projections are attached at both ends to the main body of the catheter therefore each projection, when deployed, adopts an arcuate shape along at least part of its length. (Page 4, lines 13-15)

With respect to **Claim 29**: Diamantopoulos teaches a signal processing system wherein each detector 10 transmits an analogue signal to a data interface that is converted to a digital signal, i.e. the signal processing system is electrically coupled to the at least one detector. The data

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interface 4 is coupled to a PC adapted to detect changes in the signal of the at least one detector.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Diamantopoulos et al ('263).

With respect to **Claim 18,20**: Diamantopoulos teaches that the capacitor plates are “preferably located on an outer face of the projection”. (Page 4, line 20) Examiner interprets this phrase as an implication by Diamantopoulos that the capacitor plates of a sensor can be positioned elsewhere on the projection, i.e. the opposing inner face. Thus, while Diamantopoulos does not explicitly teach an embodiment in which the plates are positioned on an inner face of the respective projection, it would be obvious to one of ordinary skill in the art to modify the device of Diamantopoulos such that a capacitor plate of the at least one sensor is located on an inner face of the at least one projection with a reasonable expectation of success to provide a sensor that is fully capable of providing a thermal topography of a vessel wall for diagnostic purposes.

Claims 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Diamantopoulos et al ('263) in view of Acker (U.S. Patent No. 5,833,608).

With respect to **Claim 21**: Diamantopoulos does not teach that at least one detector comprises an inductance coil and a magnet. Acker teaches a magnetic sensor for determination of position and orientation of a catheter. The sensing volume 32 comprises frame structure 30 housing Helmholtz inductance coil pairs 34,36,38 and galvanomagnetic sensing elements (magnets). Acker teaches that this sensing element determines the position and orientation of a probe within a patient. ('608, Abstract) Therefore, it would be obvious to modify the device of Diamantopoulos such that the at least one displacement detector comprises an inductance coil and magnet as taught by Acker to allow determination of the position and orientation of a probe within a patient, e.g. during a surgical or diagnostic procedure.

With respect to **Claim 22**: Since Diamantopoulos teaches detectors mounted on at least one resiliently biased projection, the combined teaching of Diamantopoulos and Acker teaches an inductance coil mounted on the at least one resiliently biased projection. The motivation to modify the device of Diamantopoulos such that the at least one displacement detector comprises an inductance coil and magnet as taught by Acker is stated supra with respect to claim 21.

With respect to **Claim 23**: Since Diamantopoulos teaches detectors that are integrally formed on the respective projection, the combined teaching of Diamantopoulos and Acker renders the limitation of an inductance coil integrally formed with the at least one resiliently biased projection obvious. The motivation to modify the device of Diamantopoulos such that the at least one

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displacement detector comprises an inductance coil and magnet as taught by Acker is stated *supra* with respect to claim 21.

#### **(10) Response to Argument**

Appellant's arguments filed October 17, 2008 have been fully considered but they are not persuasive. With respect to appellant's arguments regarding the rejection of independent claim 15: Appellant argues that the sensors taught by Diamantopoulos just measure temperature and therefore the sensors do not generate a signal that varies as a function of radial displacement. Appellant further argues that the fact that the temperature varies along a vessel wall at the site of an unstable plaque is not the same as a sensor signal varying as a function of radial displacement. This is not persuasive because claim 15 merely recites "a displacement detector which generates a signal which varies as a function of radial displacement of the at least one resiliently biased projection". The displacement detectors of Diamantopoulos, i.e. sensors, are mounted on the projection. The sensors provide a data signal associated with a temperature reading. The catheter with projection and sensors thereon moves along a vessel wall at the site of a plaque. The projections move inward and outward in the radial direction along the topography of the plaque. At different points while tracing the topography of the wall and plaque thereon, the sensors relay a temperature data signal at that particular radial coordinate. Thus, different temperature readings are transmitted at different radial coordinates. Diamantopoulos explicitly discloses that "it has been reported that unstable and inflamed plaque can cause the temperature of the artery wall to elevate up to 2.5 °C proximate the inflamed plaque." (Page 2, lines 28-30) Thus, in the area proximate the plaque, where the position of the sensor in the radial direction is different than when the sensor is moving along the outer wall of the plaque, the temperature associated with the signal from the



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sensor is different. The temperature difference can be discerned from the temperature readings at various radial positions, and the difference in location of the sensor in the radial and longitudinal directions will already be noted by the user. Therefore, the at least one displacement detector of Diamantopoulos will generate a temperature signal that is different from the temperature signal at a different radial coordinate, i.e. it will generate a signal which varies as a function of radial displacement of the sensor and at least one resiliently biased projection.

Appellant's arguments with regard to dependent claims 16-29 have been fully considered but are not persuasive, as appellant's arguments depend entirely on arguments regarding the rejection of claim 15, which have been addressed *supra*.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

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For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Melanie J Hand/

Examiner, Art Unit 3761

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